

WHAT IS CLAIMED IS:

- 5 1. An animal that is a fly or nematode that has been genetically modified to express or mis-express an SREBP pathway protein, or the progeny of said animal that has inherited said SREBP pathway protein expression or mis-expression.
- 10 2. The animal of Claim 1 that has been genetically modified by a method selected from the group consisting of transposon insertion mutagenesis, double-stranded RNA interference, and chemical mutagenesis.
- 15 3. The animal of Claim 1 wherein a heterologous promoter drives expression or mis-expression of said SREBP pathway protein.
- 20 4. The animal of Claim 3 wherein said promoter is selected from the group consisting of tissue-specific promoters, developmental-specific promoters, and inducible promoters.
- 25 5. The animal of Claim 4 wherein said animal is a fly and said promoter is selected from the group consisting of *sevenless*, *eyeless*, *glass*, *dpp*, heat shock, tTA-responsive, GAL4-responsive, and *vestigial*.
- 30 6. The animal of Claim 1 wherein said SREBP pathway protein is encoded by an SREBP pathway nucleic acid sequence linked to a nucleic acid sequence that encodes one or more selectable markers that allows detection of expression of said SREBP pathway protein.
7. The animal of Claim 1 wherein said expression or mis-expression of said SREBP pathway protein results in an identifiable phenotype.
8. The animal of Claim 1 wherein said SREBP pathway protein comprises an amino acid sequence selected from the group consisting of SEQ ID NOs:2, 4, 6, and 8, or a functionally-active fragment thereof.
- 35 9. The animal of Claim 8 wherein said SREBP pathway protein is encoded by part or all of a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1, 3, 5, and 7.

Sub
C4
10. The animal of Claim 7 wherein said nematode is heterozygous for deletion of SREBP.

11. The animal of Claim 7 wherein said animal is a nematode and said identifiable
5 phenotype is a pale intestine phenotype or other intestinal defect.

Sub
C2
12. A method for studying lipid metabolism comprising detecting the phenotype caused
by the expression or mis-expression of said SREBP pathway protein in the animal of Claim
1.

10
13. The method of Claim 12 additionally comprising observing a second animal having
the same genetic modification as the animal of Claim 1 which causes said expression or
mis-expression of said SREBP pathway protein, and wherein said second animal
additionally comprises a mutation in a gene of interest, wherein differences, if any, between
15 the phenotype of the animal of Claim 1 and the phenotype of the second animal identifies
the gene of interest as capable of modifying the function of the gene encoding said SREBP
pathway protein.

14. The method of Claim 13 wherein said gene of interest is implicated in cholesterol or
20 fatty acid biosynthesis or metabolism.

Sub
C6
15. The method of Claim 13 wherein said animal is a nematode and wherein said
phenotype is a pale intestine phenotype or other intestinal defect indicative of abnormalities
in lipid biosynthesis or metabolism.

25
16. The method of Claim 13 wherein said animal is a nematode and wherein said
method includes staining said nematode *in vivo* with a fluorescently-labelled fatty acid
conjugate to measure lipid content within said nematode.

30
17. The method of Claim 16 wherein said fluorescently-labelled fatty acid conjugate is
a BODIPYTM-fatty acid conjugate.

18. The method of Claim 13 additionally comprising administering one or more
compounds to said animal or its progeny and observing any changes in lipid content of said
35 animal or its progeny.

19. A method for determining the lipid content of a living nematode comprising contacting said nematode with a BODIPY™ fatty acid conjugate to stain lipid and measuring fluorescence as an indication of lipid content.

5 20. The method of Claim 19 which is used in combination with a genetic screen for detection of mutations that affect lipid content.

21. The method of Claim 19 that additionally includes administering one or more compounds to said nematode or its progeny and observing any effect said compound has on
10 lipid content.

22. An isolated nucleic acid molecule of less than 15 kb comprising a nucleic acid sequence selected from the group consisting of:

sub
C2
15 A) a nucleic acid sequence that encodes a polypeptide comprising at least 10 contiguous amino acids of the sequence of any one of SEQ ID NO:2, 4 and 6; and

B) a nucleic acid sequence that encodes a polypeptide comprising at least 8 contiguous amino acids of residues 335 to 428 of SEQ ID NO:2.

23. The isolated nucleic acid molecule of Claim 22 that hybridizes under appropriate
20 conditions to a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1, 3 and 5.

24. The isolated nucleic acid molecule of Claim 23 wherein said appropriate conditions comprise hybridization at 34°C in a buffer comprising 6X SSC / 0% formamide and a wash
25 at 45°C in a buffer comprising 2X SSC.

25. A vector comprising the nucleic acid molecule of Claim 22.

26. A host cell comprising the vector of Claim 25.

30

27. The host cell of Claim 26 wherein said cell is a yeast cell.

28. A process for producing an SREBP pathway protein comprising culturing the host cell of Claim 26 under conditions suitable for expression of said SREBP pathway protein
35 and recovering said protein.

29. An isolated SREBP pathway protein produced by the process of Claim 28.

30. The isolated SREBP pathway protein of Claim 29, which is joined at its amino- or carboxy-terminus via a peptide bond to an amino acid sequence of a different protein.

5

31. A nucleic acid molecule comprising a *C. elegans* SREBP promoter operably-linked to a heterologous gene, wherein said SREBP promoter is derived from nucleotides 66,719-71,265 of Y47D3 (GI:3646936).

10 32. The nucleic acid of Claim 31, wherein said heterologous gene encodes a selectable or detectable marker.

33. A method of detecting a candidate molecule that binds to a polypeptide comprising SEQ ID 2, 4, or 6 comprising:

15 (a) contacting said polypeptide with one or more candidate molecules under conditions conducive to binding; and

(b) detecting any binding that occurs between the candidate molecules and said polypeptide.

20

Add
C8

25

30

35